Ohio Cooperative Extension Service
The Ohio State University

ESO 824

OHIO FARM MACHINERY

ECONOMIC COST ESTIMATES FOR 1981[1]

Revised and Adopted for Ohio

by

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The following information is designed as an aid in estimating farm machinery use costs for 1981. The costs are determined by formula and represent an average cost for a specific piece of machinery. These machinery costs are intended to be average estimates for the agricultural industry.

There are two types of costs associated with owning and operating a machine: Fixed costs, which are incurred whether or not the machine is used, include depreciation, interest, insurance, housing, and taxes. Operating costs, which occur only when the machine is used, include fuel, lubrication, repairs, and labor.

Fixed Costs: Each machine is depreciated for ten years with a salvage value of ten percent and investment credit taken at the full ten percent rate. It is assumed that a piece of equipment purchased new will be used commercially for ten years even though it may be owned by several people.

Interest and insurance are calculated by multiplying the average investment (new cost plus salvage value divided by two) times the rates of interest and insurance. Interest and insurance rates are assumed to be 14 percent and .75 percent, respectively. Housing cost is assumed to be 33 cents per square foot of shelter space needed per year. There are no property taxes on farm machinery in Ohio.

Formulas Used to Compute Fixed Machinery Costs

$$\text{Depreciation per year} = \frac{\text{purchase price - investment credit - salvage value}}{\text{(years you will use machine)}}$$

$$\text{Interest per year} = \frac{\text{purchase price + salvage value}}{2} \times \text{interest rate}$$

$$\text{Insurance per year} = \frac{\text{purchase price + salvage value}}{2} \times \text{rate}$$

Housing per year = price per square foot x square feet shelter space required

Taxes per year = 0 (no taxes on personal property in Ohio)

Operating Costs: Fuel cost is calculated by multiplying the fuel consumption by the price of fuel, with fuel consumption assumed to be .06 gallons of diesel fuel per horsepower hour. The price of fuel is assumed to be $1.25 per gallon for diesel. All power units, tractors, combines, trucks, etc., are assumed to be diesel powered. An estimate of gasoline consumption can be made by multiplying the diesel fuel consumption by a factor of 1.36. Lubrication cost is assumed to be ten percent of fuel cost.

The formulas for estimating the repair and maintenance costs necessary to maintain a machine in an operable condition are provided in the 1976 Agricultural Engineer's Yearbook. They are used to estimate total accumulated repair costs according to the accumulated hours of use; the total costs are then broken down to a per hour cost estimate. The amount of annual use of a machine is an estimate of the number of hours a commercial farmer would use that particular machine in one year.

Labor is assumed to be an hourly wage rate, which includes benefits, of $5.20 per hour for unskilled labor and $7 per hour for skilled labor. Labor per acre for an operation such as plowing and disking is calculated by using the work rate on the implement instead of the tractor. Therefore, plows and disks using the same tractor have different per acre labor requirements. Less labor per acre is used in a disking operation that covers more acres per hour than in a plowing operation.

This year minimum tillage planters have been included, reflecting the current interest in minimum or reduced tillage practices in Ohio.

Machinery price increases for 1981 range from 6 percent to 22 percent over 1980. The following table compares the machinery function costs per acre for four selected items from 1978 to 1981.

Machine Function	1978	1979	1980	1981
plow 6-16	$ 6.41	$ 7.72	$10.89	$11.70
corn planter 6-30	5.51	6.52	8.20	9.50
combine small grain	8.13	10.78	14.54	14.61
combine corn 6-30	13.09	17.46	22.73	24.69

These cost estimates are not intended to be indicative of everyone's cost, but are intended to be used as a guide in planning the crop operation. Each individual has unique costs because of differences in buying power, repair programs, average annual use, and overall replacement programs.

The following tables provide the 1981 machinery function costs broken down into several categories. Some relevant supporting data also is included.

TILLAGE EQUIPMENT

MACHINE	TRACTOR HP	NEW COST	ESTIMATED ACRES/HR	ANNUAL ACRES USE	TOTAL COST/ ACRE	TOTAL COST/ HOUR	CASH COST/ ACRE	PER ACRE COST			DIESEL FUEL GAL/ACRE
								TRACTOR	IMPLEMENT	LABOR	
PLOW 2-16	40	1277.00	1.16	139.29	13.41	15.56	3.93	6.87	1.97	4.57	2.07
PLOW 3-16	60	2141.00	1.75	209.45	11.73	20.47	3.91	6.49	2.20	3.04	2.06
PLOW 4-16	75	5035.00	2.33	279.10	12.10	28.13	4.04	5.99	3.83	2.28	1.93
PLOW 5-16	100	6181.00	2.91	348.74	12.53	36.41	4.42	6.93	3.77	1.83	2.06
PLOW 6-16	120	7257.00	3.49	453.82	11.70	40.85	4.37	6.69	3.49	1.52	2.06
PLOW 7-16	140	8313.00	4.07	529.27	11.25	45.81	4.33	6.53	3.42	1.30	2.06
PLOW 8-16	160	10682.00	4.65	604.71	11.12	51.74	4.43	6.15	3.83	1.14	2.06
PLOW 9-18	225	16555.00	5.89	883.64	12.38	72.92	4.89	7.24	4.23	.90	2.29
PLOW 10-18	225	15950.00	6.55	981.82	11.01	72.04	4.36	6.52	3.68	.81	2.06
PLOW 12-18	275	20000.00	7.85	1178.18	11.22	88.15	4.48	6.71	3.84	.68	2.10
CHISEL PLOW 10 FT	140	2704.00	4.36	436.36	8.68	37.88	3.51	6.09	1.38	1.22	1.93
CHISEL PLOW 15 FT	120	3787.00	6.55	654.55	5.63	36.88	2.11	3.57	1.26	.81	1.10
CHISEL PLOW 17 FT	140	4095.00	7.42	741.82	5.50	40.81	2.14	3.58	1.20	.71	1.13
CHISEL PLOW 20 FT	160	5677.00	8.73	872.73	5.28	46.11	2.11	3.28	1.40	.61	1.10
CHISEL PLOW WING 24	225	8142.00	10.47	1047.27	6.18	64.69	2.38	4.07	1.60	.51	1.29
CHISEL PLOW WING 29	250	9431.00	12.65	1265.45	5.85	74.03	2.23	3.91	1.52	.42	1.19
CHISEL PLOW WING 35	300	10264.00	15.27	1527.27	5.15	78.66	2.12	3.43	1.37	.35	1.18
FIELD CULTIVATOR 12	75	2066.00	6.06	727.27	3.84	23.28	1.36	2.30	.67	.88	.74
FIELD CULTIVATOR 18	100	3585.00	8.73	1047.27	3.69	32.19	1.36	2.31	.77	.61	.69
FIELD CULTIVATOR 28	160	6083.00	13.58	1629.09	3.31	44.97	1.38	2.11	.81	.39	.71
FIELD CULTIVATOR 37	225	8790.00	17.94	2152.73	3.55	63.71	1.41	2.38	.88	.30	.75
FIELD CULTIVATOR 50	250	16002.00	24.24	2909.09	3.42	82.93	1.27	2.04	1.16	.22	.62
DISK 10 FT	60	3174.00	4.85	484.85	4.80	23.28	1.48	2.34	1.37	1.09	.74
DISK 16 FT	75	5825.00	7.76	775.76	4.04	31.34	1.24	1.79	1.56	.68	.58
DISK 17 FT	75	7507.00	8.24	824.24	4.19	34.55	1.24	1.69	1.86	.64	.55
DISK 20 FT	100	9279.00	9.70	969.70	4.59	44.54	1.43	2.08	1.97	.55	.62
DISK 21 FT	100	9484.00	10.18	1018.18	4.40	44.84	1.37	1.98	1.90	.52	.59
DISK 24 FT	120	12007.00	11.64	1163.64	4.56	53.04	1.44	2.01	2.10	.46	.62
DISK 28 FT	140	14205.00	13.58	1357.58	4.47	60.63	1.44	1.96	2.12	.39	.62
DISK 32 FT	160	16483.00	15.52	1551.52	4.33	67.16	1.44	1.84	2.14	.34	.62
DISK 40 FT	180	20803.00	19.39	1939.39	4.06	78.78	1.34	1.63	2.16	.27	.56
DISK OFFSET 14 FT	140	8260.00	6.11	610.91	8.00	48.89	2.84	4.35	2.78	.87	1.38
DISK OFFSET 16 FT	160	8862.00	6.98	698.18	7.48	52.21	2.81	4.10	2.62	.76	1.38
DISK OFFSET 18 FT	180	9496.00	7.85	785.45	7.20	56.58	2.77	4.03	2.50	.68	1.38
DISK-WING OFFSET 21	225	11777.00	9.16	916.36	7.85	71.97	2.87	4.66	2.62	.58	1.47
DISK-WING OFFSET 23	225	14153.00	10.04	1003.64	7.64	76.66	2.70	4.25	2.86	.53	1.35
LANDPLANE 45-12 FT	180	6538.00	6.40	480.00	8.54	54.64	3.02	4.94	2.72	.88	1.69
LANDPLANE 54-12 FT	225	9800.00	6.40	480.00	11.51	73.67	3.66	6.67	3.97	.88	2.11
LANDPLANE 54-15 FT	225	10120.00	8.00	600.00	9.39	75.11	2.94	5.33	3.35	.70	1.69
LANDPLANE 75-14 FT	225	10750.00	7.47	560.00	10.35	77.31	3.16	5.72	3.89	.75	1.81
SPRINGTOOTH DRAG 30	60	3800.00	16.00	480.00	2.43	38.87	.44	.71	1.37	.35	.22
SPRINGTOOTH DRAG 48	75	7100.00	30.25	1058.91	1.84	55.81	.31	.46	1.20	.19	.15

TRACTORS AND COMBINES (WITHOUT HEADS)

TRACTOR HP	NEW COST	ANNUAL HOURS USE	FIXED COST/HR	VARIABLE COST/ HOUR	TOTAL COST/ HOUR	REPAIR + MAINT. COST/HR	FUEL CONS./ HOUR
40 HP	11926.00	500.00	3.90	4.07	7.97	.77	2.400
60 HP	16313.00	500.00	5.33	6.00	11.33	1.05	3.600
75 HP	19805.00	500.00	6.46	7.47	13.92	1.28	4.500
100 HP	32772.00	550.00	9.68	10.47	20.15	2.22	6.000
120 HP	37087.00	550.00	10.94	12.41	23.35	2.51	7.200
140 HP	41324.00	550.00	12.23	14.35	26.57	2.80	8.400
160 HP	45082.00	600.00	12.22	16.39	28.60	3.19	9.600
180 HP	49126.00	600.00	13.30	18.32	31.63	3.47	10.800
225 HP 4WD	63683.00	500.00	20.69	21.99	42.67	3.43	13.500
250 HP 4WD	76174.00	500.00	24.71	24.72	49.43	4.10	15.000
275 HP 4WD	79311.00	500.00	25.72	26.95	52.68	4.27	16.500
300 HP 4WD	73155.00	500.00	23.74	28.69	52.42	3.94	18.000
320 HP 4WD	92696.00	500.00	30.04	31.39	61.42	4.99	19.200
350 HP 4WD	95163.00	500.00	30.83	33.99	64.83	5.12	21.000
SML COMBINE	40043.00	300.00	21.84	22.51	44.35	14.26	6.000
MED COMBINE	50864.00	300.00	27.76	28.02	55.78	18.12	7.200
LRG COMBINE	64458.00	300.00	35.17	34.92	70.09	22.96	8.700
JMB COMBINE	80121.00	300.00	43.67	45.04	88.71	28.54	12.000

PLANTING EQUIPMENT

MACHINE	TRACTOR HP	NEW COST	ESTIMATED ACRES/HR	ANNUAL ACRES USE	TOTAL COST/ ACRE	TOTAL COST/ HOUR	CASH COST/ ACRE	PER ACRE COST TRACTOR	PER ACRE COST IMPLEMENT	PER ACRE COST LABOR	DIESEL FUEL GAL/ACRE
CORN PLANTER 4-38	40	6919.00	4.83	290.03	8.25	39.88	1.75	1.65	4.92	1.68	.50
CORN PLANTER 6-38	60	9995.00	7.25	435.27	7.39	53.61	1.70	1.56	4.71	1.12	.50
CORN PLANTER 6-30	60	10254.00	5.73	343.64	9.50	54.42	2.18	1.98	6.11	1.42	.63
CORN PLANTER 8-30	75	15495.00	7.64	458.18	9.77	74.57	2.26	1.82	6.88	1.06	.59
POTATO PLANTER 4 ROW	120	13500.00	3.83	248.97	21.16	81.05	5.55	6.10	11.11	3.95	1.88
BEET PLANTER 12 ROW	100	6200.00	4.67	280.00	10.76	50.23	3.09	4.32	4.59	1.86	1.29
GRAIN DRILL PW 14 FT	40	5487.00	5.57	445.96	5.60	31.23	1.43	1.43	2.78	1.39	.43
GRAIN DRILL PW 16 FT	60	12144.00	6.37	509.67	8.29	52.81	2.30	1.78	5.29	1.22	.57
GRAIN DRILL PW 20 FT	75	13169.00	7.96	637.09	7.33	58.34	2.11	1.75	4.60	.98	.57
GRAIN DRILL PW 24 FT	75	17366.00	9.56	764.51	7.32	69.92	2.07	1.46	5.05	.81	.47
GRAIN DRILL PW 28 FT	100	19465.00	11.15	891.93	7.36	82.03	2.18	1.81	4.85	.70	.54
MIN-TIL PLANTER 4-38	40	8016.00	3.76	225.58	11.58	43.52	2.43	2.12	7.30	2.16	.64
MIN-TIL PLANTER 6-38	60	13723.00	5.64	338.55	11.69	65.99	2.60	2.01	8.25	1.44	.64
MIN-TIL PLANTER 6-30	60	12216.00	4.45	267.27	13.68	60.93	3.09	2.54	9.31	1.82	.81
MIN-TIL PLANTER 8-30	75	17139.00	5.94	356.36	13.47	80.03	3.09	2.34	9.76	1.37	.76
MIN-TIL PLANTER 8-38	75	14890.00	7.42	445.45	9.77	72.56	2.28	1.88	6.80	1.09	.61
MIN-TIL PLANTER 12-30	120	23359.00	8.91	534.55	12.38	110.32	3.05	2.62	8.85	.91	.81

MAINTENANCE EQUIPMENT

MACHINE	TRACTOR HP	NEW COST	ESTIMATED ACRES/HR	ANNUAL ACRES USE	TOTAL COST/ ACRE	TOTAL COST/ HOUR	CASH COST/ ACRE	PER ACRE COST TRACTOR	PER ACRE COST IMPLEMENT	PER ACRE COST LABOR	DIESEL FUEL GAL/ACRE
CULTIVATOR 4-38	40	2050.00	4.91	491.05	3.61	17.71	.98	1.62	.88	1.10	.49
CULTIVATOR 6-38	60	2973.00	7.37	736.97	3.12	23.02	.96	1.54	.85	.73	.49
CULTIVATOR 6-30	60	2626.00	5.82	581.82	3.82	22.25	1.20	1.95	.95	.93	.62
CULTIVATOR 8-30	75	3473.00	7.76	775.76	3.44	26.65	1.13	1.79	.94	.70	.58
CULTIVATOR 12-30	140	5760.00	11.64	1163.64	3.77	43.82	1.41	2.28	1.02	.46	.72
ROTARY HOE 16	40	2451.00	10.86	434.42	2.28	24.80	.44	.73	1.07	.48	.22
POTATO CULT. 4 ROW	75	3350.00	6.13	796.70	4.06	24.87	1.43	2.27	.90	.88	.73
BEET CULT. 12 ROW	100	5500.00	6.00	360.00	7.14	42.87	2.03	3.36	2.89	.90	1.00
BEET THINNER 6 ROW	100	13780.00	2.10	210.00	26.26	55.14	7.37	9.59	13.20	3.47	2.86
BEET THINNER 12 ROW	120	26437.00	4.20	420.00	19.85	83.35	5.25	5.56	12.55	1.73	1.71
SPRAYER 30 FT	40	3562.00	14.18	1134.55	1.91	27.05	.47	.56	.73	.62	.17
SPRAYER 50 FT	60	3633.00	23.64	2363.64	1.24	29.42	.37	.48	.40	.37	.15
SPRAYER HI PRES 50FT	60	4766.00	23.64	2363.64	1.36	32.12	.41	.48	.51	.37	.15
ANHYDROUS APPLICATOR	120	3870.00	8.91	356.36	5.56	49.56	1.67	2.62	2.17	.78	.81
FERTILIZER SPRDR 40	60	3700.00	38.79	1163.64	1.03	39.94	.18	.29	.56	.18	.09
SHREDDER 12 FT	60	5871.00	4.36	436.36	6.33	27.63	1.68	2.60	2.54	1.19	.83

HARVESTING EQUIPMENT

MACHINE	TRACTOR HP	NEW COST	ESTIMATED ACRES/HR	ANNUAL ACRES USE	TOTAL COST/ ACRE	TOTAL COST/ HOUR	CASH COST/ ACRE	PER ACRE COST			DIESEL FUEL GAL/ACRE
								TRACTOR	IMPLEMENT	LABOR	
SWATHER-COND. 12 FT	---	14694.00	5.45	436.36	7.98	43.50	1.44	0	7.02	.95	.55
SWATHER-COND. 15 FT	---	17769.00	6.82	545.45	7.44	50.71	1.27	0	6.67	.76	.44
SWATHER 12 FT	---	16180.00	5.82	465.45	8.06	46.87	1.42	0	7.16	.89	.52
SWATHER 15 FT	---	17391.00	7.27	581.82	6.85	49.85	1.18	0	6.14	.71	.41
SWATHER 18 FT	---	17710.00	8.73	698.18	5.82	50.78	.99	0	5.22	.60	.34
SWATHER 20 FT	---	18384.00	9.70	775.76	5.41	52.45	.91	0	4.87	.54	.31
1 TON STACKER	60	7891.00	4.15	829.09	6.96	28.87	2.21	2.73	2.36	1.87	.87
3 TON STACKER	75	15125.00	4.84	1064.00	8.14	39.38	2.85	2.88	3.66	1.61	.93
6 TON STACKER	100	19937.00	5.53	1547.64	8.84	48.88	3.55	3.64	3.79	1.41	1.09
BALER PTO TWINE	40	7459.00	3.78	756.36	6.41	24.24	1.65	2.11	2.25	2.05	.63
ROUND BALER	60	10545.00	4.64	927.27	6.23	28.88	1.96	2.44	2.54	1.24	.78
ROTARY MOWER	40	1189.00	2.73	272.73	5.81	15.86	1.70	2.92	.98	1.91	.88
RAKE (HYD)	40	2679.00	3.49	698.18	4.73	16.50	1.45	2.28	.95	1.49	.69
FORAGE HARV. 1 ROW	60	7210.00	.95	94.55	35.17	33.25	8.66	11.98	14.97	8.22	3.81
FORAGE HARV. 2 ROW	100	13271.00	1.65	165.45	32.51	53.79	8.76	12.18	15.64	4.70	3.63
FOR HARV 2 ROW SP	---	49993.00	2.04	305.45	42.06	85.65	11.62	0	38.24	3.82	3.63
FOR HAR 3 ROW SP	---	52600.00	3.05	458.18	29.73	90.82	8.47	0	27.19	2.54	2.78
FORAGE BLOWER LG	60	2402.00	1.00	50.00	25.02	25.02	6.56	11.33	8.49	5.20	3.60
CORN PICKER 2-38	40	13653.00	1.49	223.36	23.90	35.59	6.01	5.35	13.33	5.22	1.61
PICKER-SHELLER 2-ROW	60	11560.00	1.49	223.36	24.14	35.95	6.80	7.61	11.32	5.22	2.42
COMBINE SM GRAIN SML	SML	4223.00	4.10	819.39	13.89	56.90	5.81	10.82	1.17	1.90	1.46
COMBINE SM GRAIN MED	MED	4884.00	4.73	945.45	14.61	69.09	6.24	11.80	1.17	1.64	1.52
COMBINE SM GRAIN LGE	LRG	6107.00	6.30	1260.61	13.45	84.78	5.83	11.12	1.10	1.23	1.38
COMBINE SOYBEANS SML	SML	6325.00	3.58	716.97	16.53	59.26	6.81	12.37	1.99	2.17	1.67
COMBINE SOYBEANS MED	MED	7008.00	4.14	827.27	17.27	71.44	7.29	13.48	1.91	1.88	1.74
COMBINE SOYBEANS LGE	LRG	8508.00	4.96	992.73	17.62	87.47	7.55	14.12	1.94	1.57	1.75
COMBINE CORN 3-30 SM	SML	8286.00	1.77	354.55	35.58	63.07	15.04	25.02	6.18	4.38	3.38
COMBINE CORN 2-38 SM	SML	4828.00	1.49	297.82	39.31	58.54	16.74	29.78	4.31	5.22	4.03
COMBINE CORN 3-38 SM	SML	7928.00	2.25	449.09	27.88	62.61	11.80	19.75	4.67	3.46	2.67
COMBINE CORN 4-38 MD	MED	10509.00	2.99	598.47	25.88	77.45	11.12	18.64	4.65	2.60	2.41
COMBINE CORN 4-30 MD	MED	10215.00	2.50	520.00	29.63	77.03	12.75	21.45	5.19	2.99	2.77
COMBINE CORN 6-30 LG	LRG	13936.00	3.90	780.00	24.69	96.28	10.75	17.97	4.72	1.99	2.23
COMBINE CORN 8-30 LG	LRG	18174.00	4.73	945.45	21.55	101.88	9.32	14.83	5.08	1.64	1.84
COMBINE CORN 12-30 J	JMB	29486.00	7.09	1418.18	18.09	128.29	8.44	12.51	5.47	.11	1.69
POTATO HRVSTR. 2 ROW	120	22000.00	2.49	298.76	31.31	77.96	7.10	9.38	14.18	7.76	2.89
BEET LIFTER 3 ROW	100	25515.00	2.60	208.00	32.60	84.76	6.02	7.75	21.86	2.99	2.31
BEET LIFTER 4 ROW	100	26192.00	3.47	277.21	24.93	86.38	4.56	5.81	16.87	2.24	1.73
BEET LIFTER 6 ROW	120	27100.00	5.20	416.00	17.65	91.79	3.45	4.49	11.67	1.49	1.38
BEET TOPPER 3 ROW	60	8000.00	3.20	256.00	11.54	36.93	2.57	3.54	5.81	2.19	1.13
BEET TOPPER 4 ROW	75	9500.00	4.26	341.18	10.10	43.09	2.37	3.26	5.20	1.64	1.06
BEET TOPPER 6 ROW	100	10500.00	6.40	512.00	8.09	51.79	2.09	3.15	3.85	1.09	.94
BEET WAGON 8 TON	75	6600.00	3.47	277.21	9.75	33.77	2.34	4.02	4.23	1.50	1.30

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Roy M. Kottman, Director of the Cooperative Extension Service, The Ohio State University.